



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,242	07/03/2003	Ravikumar Kudaravalli	GEMS0204PA	1241
27256	7590	08/26/2004	EXAMINER	
ARTZ & ARTZ, P.C. 28333 TELEGRAPH RD. SUITE 250 SOUTHFIELD, MI 48034			DOERRLER, WILLIAM CHARLES	
			ART UNIT	PAPER NUMBER
			3744	

DATE MAILED: 08/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/604,242	Applicant(s) KUDARAVALLI, RAVIKUMAR	
	Examiner William C Doerrier	Art Unit 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7-3-2003</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5,8,16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuck et al in view of Bartlett.

Schuck et al disclose applicant's basic inventive concept, a cooling system for an MRI system which circulates helium using a compressor 20 and precools the helium using nitrogen which is vented (at 42), substantially as claimed with the exception of using a regenerative heat exchanger to cool the incoming stream using an exiting stream.

Bartlett shows this feature to be old in the cryogenic cooling art. It would have been obvious to one of ordinary skill in the art at the time of applicant's invention from the teaching of Bartlett to modify the cooling system of Schuck et al by using a regenerative heat exchanger to improve the efficiency of the system by transferring heat from a refrigerant entering the cold sink using refrigerant whose energy (coldness) might otherwise be wasted.

Claims 6,7,9,10-15,17,19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuck et al in view of Bartlett as applied to claims 1-5,8,16 and 18 above, and further in view of any one of Agrawal et al '516, Alexeev et al or Acharya et al.

Schuck et al, as modified, discloses applicant's basic inventive concept, a cryogenic cooling system which uses a second cryogen (nitrogen to cool a first cryogen (helium) which is circulating through an MRI machine, substantially as claimed with the exception of using a precooler which cools the circulating first refrigerant using an ambient heat sink. Agrawal et al '516, Alexeev et al and Acharya et al each show this feature to be old in the cryogenic cooling art. It would have been obvious to one of ordinary skill in the art from the teaching of Agrawal et al '516, Alexeev et al or Acharya et al to modify the cryogenic cooler of Schuck et al by adding an ambient heat exchanger to reduce the heat of the circulating coolant as much as possible using an economical heat sink. It is noted that the recirculating coolant of the Agrawal et al '516, Alexeev et al or Acharya et al references is compressed at basically room temperature, so the temperature entering the compressor (or leaving any regenerative heat exchanger will be close to room temperature.

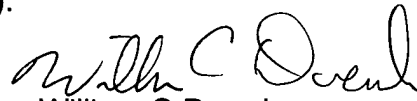
Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Thiesen et al and Annable show cryogenic coolers with regenerative heat exchangers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C Doerrler whose telephone number is (703) 308-0696. The examiner can normally be reached on Monday-Friday 6:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Denise Esquivel can be reached on (703) 308-2597. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


William C Doerrler
Primary Examiner
Art Unit 3744

WCD